REMARKS

Favorable reconsideration of the application is respectfully requested in light of the amendments and remarks herein.

Upon entry of this amendment, claims 1-43 will be pending.

§ 103 Rejection of Claims 1-43

In Section 3 of the Office Action, claims 1-43 stand rejected under 35 U.S.C. §102(e) as being anticipated by Sharma *et al.* (U.S. Patent No.6,385,329; hereinafter referred to as "Sharma").

Embodiments of the present invention provide apparatus, method, and program for detecting and recovering data embedded in information material, wherein the data is embedded in the material using a transform domain representation of at least one of the data and the information material by arranging for the data to modulate a predetermined data sequence to form modulated data and combining the modulated data with the material. For example, the structure of apparatus claim 1 includes:

> "*a transform processor* operable to transform the material into a transform domain representation of said information material
>
> *a correlation processor* operable to <u>correlate transform domain data symbols bearing said modulated data</u> from said transform domain representation with a reproduced version of <u>said predetermined data sequence</u> to form a correlation output signal and to recover said embedded data from said correlation output signal,
>
> wherein said correlation processor is operable to perform said correlation of transform domain data symbols with data symbols of the predetermined data sequence, for a plurality of start positions in said transform domain, said start positions representing at least one relative possible shift of said transform domain data, and <u>if said shift of said transform data represents a loss or corruption of transform domain data symbols, omitting corresponding symbols from said predetermined data sequence in said</u>

00270318

> correlation, said lost or corrupted transform domain data symbols and said corresponding symbols of said predetermined data sequence not being included in calculating the correlation output signal."

(emphasis added)

Therefore, claim 1, in part, includes "a correlation processor operable to correlate transform domain data symbols bearing said modulated data from said transform domain representation with a reproduced version of said predetermined data sequence."

By contrast, Sharma does not correlate the watermarked image with a predetermined data sequence within the meaning of claim 1 but instead correlates the watermarked image with an orientation pattern derived from the image itself. The Office Action, on page 3, indicates that the predetermined data sequence of claim 1 corresponds to the carrier signal 208 of Sharma and not the orientation pattern of Sharma.

Further, claim 1 states that "if said shift of said transform data represents a loss or corruption of transform domain data symbols, omitting corresponding symbols from said predetermined data sequence in said correlation, said lost or corrupted transform domain data symbols and said corresponding symbols of said predetermined data sequence not being included in calculating the correlation output signal." The Office Action, on page 4, indicates that this limitation is disclosed in column 7, lines 49-52 and 61-64. However, theses passages do not contemplate "omitting corresponding symbols from said predetermined data sequence in said correlation" where there is a loss or corruption of transform data symbols. Sharma simply describes the filtering of the watermarked signal itself to remove "aspects of the signal that are unlikely to be helpful in recovering the message." These aspects may be portions of the original signal or other watermarked signals. There is no disclosure that these aspects may include "a loss or corruption of transform domain data symbols". Moreover, filtering the watermarked

PATENT
Appl. No. 10/007,085
Attorney Docket No. 450110-03708

signal is not equivalent to "omitting corresponding symbols from said predetermined data sequence in said correlation." This feature is not disclosed in Sharma irrespective of whether the predetermined data sequence is considered to be corresponding to the carrier signal or the orientation signal because no "corresponding symbols" are omitted from either of these signals.

The filtering provided by Sharma does not provide the same effect as that of the apparatus recited in claim 1. For example, when considering transform domain symbols that may have been lost due to a predetermined shift, the transform domain symbols cannot be filtered or removed using the filter of Sharma because they no longer exist. However, the apparatus of claim 1 recognizes that the overall effect of the loss of these transform domain symbols on a correlation calculation can be reduced by omitting them from the calculation. Even when the transform domain data symbols are corrupted rather than lost, these symbols would be filtered out in Sharma, whereas in claim 1, the symbols are not filtered out but rather omits the contribution to the correlation calculation.

Based on the foregoing discussion, it is submitted that claim 1 should be allowable over Sharma. Since independent claims 18 and 42 closely parallel, and include substantially similar limitations as recited in, claim 1, claims 18 and 42 should also be allowable over Sharma.

The structure of apparatus claim 23 includes:

"*a correlation processor* <u>operable in combination with a data sequence processor to form a correlation sequence</u>, and

a data processor operable under control of the correlation processor to correlate information material data symbols, with which said modulated data have been combined, with said correlation sequence, to form a correlation output signal representing the correlation between the information material data symbols and said correlation data sequence, and to recover said embedded data from said correlation output signal,

18

00270318

> wherein <u>said correlation sequence comprises a plurality of predetermined data sequence versions, each of said versions being provided by shifting the predetermined data sequence used to form said modulated data with respect to others of said versions</u>."

(emphasis added)

As with claim 1, the predetermined data sequence of claim 23 corresponds most closely to the carrier signal of Sharma. However, the carrier signal of Sharma is not combined with other versions of the carrier signal to produce a correlation sequence which is then correlated with the information material data symbols (i.e., the watermarked signal) to generate a correlation output signal. Thus, Sharma fails to teach or suggest correlating the watermarked image with a predetermined data sequence (or in this case, a correlation sequence comprising the predetermined data sequences). Rather, Sharma discloses correlating the watermarked image with an orientation pattern derived from the image itself.

Based on the foregoing discussion, it is submitted that claim 23 should be allowable over Sharma. Since independent claims 36 and 43 closely parallel, and include substantially similar limitations as recited in, claim 23, claims 36 and 43 should also be allowable over Sharma.

Claim 14 provides an apparatus for embedding data into information material, which data can be detected and recovered by the apparatus as claimed in any preceding claim. The structure of apparatus claim 14 includes:

> "*a combining processor* operable to modulate a predetermined data sequence with said data, to form modulated data and to combine said modulated data with said material in one of a transform domain representation or an inverse transform domain representation of said material,
>
> wherein said combining processor is operable to form said modulated data into a transform domain representation, by introducing said data into at least one of a plurality of transform domain sub-bands, said modulated

data being added to data symbols within said sub-band, including
transform data symbols within extremes of said sub-band."

(emphasis added)

Claim 14 provides an apparatus for embedding data into information material in which data can be detected and received by the apparatus of claims 1 to 13. Accordingly, claim 14 requires the embedded data to be provided in such a way as to be recoverable in accordance with claim 1. Sharma does not disclose an embedding apparatus which embeds data in such a way that it can be recovered by the apparatus of claim 1. Furthermore, claim 14 specifies "said modulated data being added to data symbols within the sub-band, including transform data symbols within extremes of the sub-band". Sharma does not disclose adding modulated data within extremes of the sub-band. Embodiments of claims 1 to 13 enable processing of a watermarked signal in which modulated data has been added within extremes of the sub-band even when the transform data symbols have been subsequently shifted. The detector of Sharma cannot process added data within the extremes of the sub-band because it lacks the relevant features of claim 14.

Based on the foregoing discussion, it is submitted that claim 14 should be allowable over Sharma. Further, since claims 1-17, 19-22, 24-35, and 37-41 depend from one of claims 1, 18, 23, and 36, claims 1-17, 19-22, 24-35, and 37-41 should also be allowable over Sharma.

Accordingly, it is submitted that the rejection of claims 1-43 based upon 35 U.S.C. §103(a) has been overcome by the present remarks and withdrawal thereof is respectfully requested.

00270318

Conclusion

In view of the foregoing, entry of this amendment, and the allowance of this application with claims 1-43 are respectfully solicited.

In regard to the claims amended herein and throughout the prosecution of this application, it is submitted that these claims, as originally presented, are patentably distinct over the prior art of record, and that these claims were in full compliance with the requirements of 35 U.S.C. §112. Changes that have been made to these claims were not made for the purpose of patentability within the meaning of 35 U.S.C. §§101, 102, 103 or 112. Rather, these changes were made simply for clarification and to round out the scope of protection to which Applicant is entitled.
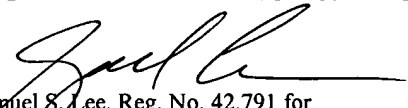
In the event that additional cooperation in this case may be helpful to complete its prosecution, the Examiner is cordially invited to contact Applicant's representative at the telephone number written below.

The Commissioner is hereby authorized to charge any insufficient fees or credit any overpayment associated with the above-identified application to Deposit Account 50-0320.

Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP

By: Samuel S. Lee, Reg. No. 42,791 for
William S. Frommer
Reg. No. 25,506
(212) 588-0800

00270318